IN THE TITLE OF THE APPLICATION:

Please replace the title with the following:

--III-V GROUP COMPOUND SEMICONDUCTOR AND LIGHT EMITTING DEVICE--.

IN THE SPECIFICATION:

Please amend the paragraph on page 1, lines 3-6 as follows:

The present invention relates to a ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_xGa_yAl_zN$ ($x+y+z=1$, $0 \leqq x \leqq 1$, $0 \leqq y \leqq 1$, $0 \leqq z \leqq 1$) and a light emitting device obtained by using the same.

Please amend the paragraph on page 1, lines 8-19 as follows:

As materials of light emitting devices such as ultraviolet, blue or green light emitting diodes, ultraviolet, blue or green laser diodes and the like, ~~3-5~~ III-V group compound semiconductors represented by the general formula $In_xGa_yAl_zN$ (wherein, $x+y+z=1$, $0 \leqq x \leqq 1$, $0 \leqq y \leqq 1$, $0 \leqq z \leqq 1$) are known. Hereinafter, x, y and z in this general formula are described as InN crystal mixing ratio, GaN crystal mixing ratio and AlN crystal mixing ratio, in some cases. Of the ~~3-5~~ III-V group compound semiconductors, those containing InN in a crystal mixing ratio of 10% or more are particularly important

for display uses since it is possible to control a light emitting wavelength in the visible region, depending on InN crystal mixing ratio.

Please amend the paragraph beginning on page 2, line 20 and ending on page 3, line 5 as follows:

An object of the present invention is to provide a ~~3-5~~ III-V group compound semiconductor having a concentration of a p-type dopant of 1×10^{17} cm^{-3} or more and 1×10^{21} cm^{-3} or less, which can be laminated to control the carrier concentration of an InGaAlN-type mixed crystal in a low range with high reproducibility. Another object of the present invention is to provide a ~~3-5~~ III-V group compound semiconductor in which the carrier concentration of an InGaAlN-type mixed crystal is controlled in a low range with high reproducibility, and a light emitting device having high light emitting efficiency obtained by using this ~~3-5~~ III-V group compound semiconductor.

Please amend the paragraph on page 3, lines 8-14 as follows:

The present inventors have intensively studied, in view of the above-mentioned problems, and resultantly found that an n-type ~~3-5~~ III-V group compound semiconductor having a small carrier concentration can be produced with high reproducibility

when a p-type dopant is doped at a specific concentration, in growth at low temperatures at which carrier concentration cannot be controlled easily, leading to completion of the invention.

Please amend the paragraph on page 3, lines 15-20 as follows:

Namely, the present invention relates to [1] a ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_xGa_yAl_zN$ ($x+y+z=1$, $0 \leqq x \leqq 1$, $0 \leqq y \leqq 1$, $0 \leqq z \leqq 1$) in which the concentration of an n-type carrier is 1×10^{19} cm^{-3} or less, wherein the concentration of a p-type dopant is 1×10^{17} cm^{-3} or more and 1×10^{21} cm^{-3} or less.

Please amend the paragraph beginning on page 3, line 21 to page 4, line 6 as follows:

Further, the present invention relates to [2] a ~~3-5~~ III-V group compound semiconductor having a structure in which a second layer composed of a ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_uGa_vAl_wN$ ($u+v+w=1$, $0<u \leqq 1$, $0 \leqq v<1$, $0 \leqq w<1$) is adjacent to a first layer composed of a ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_xGa_yAl_zN$ ($x+y+z=1$, $0 \leqq x \leqq 1$, $0 \leqq y \leqq 1$, $0 \leqq z \leqq 1$)

in which the concentration of an n-type carrier is 1×10^{19} cm^{-3} or less, wherein the concentration of a p-type dopant is 1×10^{17} cm^{-3} or more and 1×10^{21} cm^{-3} or less, and the band gap is larger than that of the above-mentioned second layer.

Please amend the paragraph on page 4, lines 7-16 as follows:

Further, the present invention relates to [3] a ~~3-5~~ III-V group compound semiconductor having a structure in which a layer composed of a ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_xGa_yAl_zN$ ($x+y+z=1$, $0\leqq x\leqq 1$, $0\leqq y\leqq 1$, $0\leqq z\leqq 1$) in which the concentration of an n-type carrier is 1×10^{19} cm^{-3} or less, wherein the concentration of a p-type dopant is 1×10^{17} cm^{-3} or more and 1×10^{21} cm^{-3} or less is adjacent to a layer composed of a p-type ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_aGa_bAl_cN$ ($a+b+c=1$, $0\leqq a\leqq 1$, $0\leqq b\leqq 1$, $0\leqq c\leqq 1$).

Please amend the paragraph beginning on page 4, line 17 to page 5, line 3 as follows:

Further, the present invention relates to [4] a ~~3-5~~ III-V group compound semiconductor having a structure comprising at least one layer composed of a ~~3-5~~ III-V group compound

semiconductor represented by the general formula $In_xGa_yAl_zN$ ($x+y+z=1$, $0 \leqq x \leqq 1$, $0 \leqq y \leqq 1$, $0 \leqq z \leqq 1$) in which the concentration of an n-type carrier is 1×10^{19} cm^{-3} or less, wherein the concentration of a p-type dopant is 1×10^{17} cm^{-3} or more and 1×10^{21} cm^{-3} or less, between a layer composed of a ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_uGa_vAl_wN$ ($u+v+w=1$, $0 \leqq u \leqq 1$, $0 \leqq v \leqq 1$, $0 \leqq w \leqq 1$) and a layer composed of a p-type ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_aGa_bAl_cN$ ($a+b+c=1$, $0 < a \leqq 1$, $0 \leqq b < 1$, $0 \leqq c < 1$).

Please amend the paragraph on page 5, lines 4-22 as follows:

Further, the present invention relates to [5] a ~~3-5~~ III-V group compound semiconductor having a structure comprising a second layer composed of a ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_uGa_vAl_wN$ ($u+v+w=1$, $0 < u \leqq 1$, $0 \leqq v < 1$, $0 \leqq w < 1$) carrying thereon a laminated layer composed of an n-type ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_pGa_qAl_rN$ ($p+q+r=1$, $0 \leqq p \leqq 1$, $0 \leqq q \leqq 1$, $0 \leqq r \leqq 1$) having larger band gap than that of the above-mentioned second layer, and at least one layer

composed of a ~~3—5~~ III-V group compound semiconductor represented by the general formula $In_xGa_yAl_zN$ ($x+y+z=1$, $0 \leqq x \leqq 1$, $0 \leqq y \leqq 1$, $0 \leqq z \leqq 1$) in which the concentration of an n-type carrier is 1×10^{19} cm^{-3} or less, wherein the concentration of a p-type dopant is 1×10^{17} cm^{-3} or more and 1×10^{21} cm^{-3} or less, between the above-mentioned layer composed of the n-type ~~3—5~~ III-V group compound semiconductor and a third layer composed of a p-type ~~3—5~~ III-V group compound semiconductor represented by the general formula $In_aGa_bAl_cN$ ($a+b+c=1$, $0 \leqq a \leqq 1$, $0 \leqq b \leqq 1$, $0 \leqq c \leqq 1$), on the opposite side to the above-mentioned second layer.

Please amend the paragraph beginning on page 5, line 23 to page 6, line 6 as follows:

Further, the present invention relates to [6] a method of producing a ~~3—5~~ III-V group compound semiconductor according to any of [1] to [5], comprising growing a ~~3—5~~ III-V group compound semiconductor represented by the general formula $In_xGa_yAl_zN$ ($x+y+z=1$, $0 \leqq x \leqq 1$, $0 \leqq y \leqq 1$, $0 \leqq z \leqq 1$) in which the concentration of an n-type carrier is 1×10^{19} cm^{-3} or less, wherein the concentration of a p-type dopant is 1×10^{17} cm^{-3} or more and 1×10^{21} cm^{-3} or less, at temperatures of 600°C or more and 950°C or less according to a metal organic vapor phase growth method.

Please amend the paragraph on page 6, lines 7-9 as follows:

Further, the present invention relates to [7] a light emitting device obtained by using a ~~3—5~~ III-V group compound semiconductor according to any of [1] to [5].

Please amend the paragraph on page 6, lines 12-20 as follows:

As the method of producing a ~~3—5~~ III-V group compound semiconductor in the present invention, there are listed a molecular beam epitaxy (hereinafter, abbreviated as MBE in some cases) method, a metal organic vapor phase epitaxy (hereinafter, abbreviated as MOVPE in some cases) method, a hydride vapor phase epitaxy (hereinafter, abbreviated as HVPE in some cases) method, and the like. Of them, an MOVPE method is particularly important since a crystal can be grown uniformly over a large area.

Please amend the paragraph on page 6, lines 21-23 as follows:

In production of a ~~3—5~~ III-V group compound semiconductor according to an MOVPE method, the following raw materials can be used.

Please amend the paragraph on page 6, line 24 to page 7, line 13 as follows:

As the Group ~~3~~ III raw material, trialkylgallium of the general formula $R_1R_2R_3Ga$ (wherein, R_1, R_2 and R_3 represent a lower alkyl group) such as trimethylgallium [$(CH_3)_3Ga$, hereinafter, abbreviated as TMG in some cases], triethylgallium [$(C_2H_5)_3Ga$, hereinafter, abbreviated as TEG in some cases] and the like; trialkylaluminum of the general formula $R_1R_2R_3Al$ (wherein, R_1, R_2 and R_3 represent a lower alkyl group) such as trimethylaluminum [$(CH_3)_3Al$], triethylaluminum [$(C_2H_5)_3Al$, hereinafter, abbreviated as TEA in some cases], triisobutylaluminum [$(i\text{-}C_4H_9)_3Al$] and the like; trimethylaminealane [$(CH_3)_3N{:}AlH_3$]; trialkylindium of the general formula $R_1R_2R_3In$ (wherein, R_1, R_2 and R_3 represent a lower alkyl group) such as trimethylindium [$(CH_3)_3In$, hereinafter, abbreviated as "TMI" in some cases], triethylindium [$(C_2H_5)_3In$] and the like; and other materials, are listed. These are used alone or in admixture.

Please amend the paragraph on page 7, lines 14-20 as follows:

As the Group ~~5~~ V raw material, ammonia, hydrazine, methylhydrazine, 1,1-dimethylhydrazine, 1,2-dimethylhydrazine, t-butylamine, ethylenediamine and the like are listed. These

are used alone or in admixture. Of these raw materials, ammonia and hydrazine are suitable since they contain no carbon atom in the molecule and consequently cause small contamination of carbon into a semiconductor.

Please amend the paragraph on page 7, lines 21-25 as follows:

As the p-type dopant which can be used in the present invention, Group ~~2~~ II metals are listed. Specifically, Be, Mg, Ca, Zn, Cd and Hg are listed. Among them, Be, Mg, Ca, Zn and Cd are useful since they can be used simply. The dopant can be used alone or in combination of two or more.

Please amend the paragraph on page 8, lines 15-20 as follows:

The ~~3-5~~ III-V group compound semiconductor [1] of the present invention is a ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_xGa_yAl_zN$ ($x+y+z=1$, $0 \leqq x \leqq 1$, $0 \leqq y \leqq 1$, $0 \leqq z \leqq 1$) in which the concentration of an n-type carrier is 1×10^{19} cm^{-3} or less, wherein the concentration of a p-type dopant is 1×10^{17} cm^{-3} or more and 1×10^{21} cm^{-3} or less.

Please amend the paragraph beginning on page 8, line 21 to page 9, line 8 as follows:

Further, ~~3-5~~ III-V group compound semiconductor [2] of the present invention has a structure in which a second layer composed of a ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_uGa_vAl_wN$ ($u+v+w=1$, $0<u\leqq 1$, $0\leqq v<1$, $0\leqq w<1$) is adjacent to a first layer composed of a ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_xGa_yAl_zN$ ($x+y+z=1$, $0\leqq x\leqq 1$, $0\leqq y\leqq 1$, $0\leqq z\leqq 1$) in which the concentration of an n-type carrier is 1×10^{19} cm^{-3} or less, wherein the concentration of a p-type dopant is 1×10^{17} cm^{-3} or more and 1×10^{21} cm^{-3} or less, and the band gap is larger than that of the above-mentioned second layer (hereinafter, the first layer is referred to as low carrier concentration layer, in some cases).

Please amend the paragraph beginning on page 9, line 22 to page 10, line 9 as follows:

When the p-type dopant concentration is smaller than 1×10^{17} cm^{-3}, it is difficult to control the n-type carrier concentration of a compound semiconductor doped with a p-type impurity, to the intended small value, with high reproducibility. When the p-type dopant concentration is larger than 10^{21} cm^{-3}, the compound

semiconductor doped with a p-type impurity manifests reduction in crystallinity, and when it is laminated with a layer (light emitting layer) composed of a ~~3—5~~ III-V group compound semiconductor represented by the general formula $In_uGa_vAl_wN$ ($u+v+w=1$, $0<u\leqq1$, $0\leqq v<1$, $0\leqq w<1$), the properties of the light emitting layer may decrease in some cases. The more preferable concentration of a p-type impurity is 1×10^{18} cm^{-3} or more and 1×10^{20} cm^{-3} or less.

Please amend the paragraph on page 10, lines 10-19 as follows:

Further, the ~~3—5~~ III-V group compound semiconductor [3] of the present invention has a structure in which a layer composed of a ~~3—5~~ III-V group compound semiconductor represented by the general formula $In_xGa_yAl_zN$ ($x+y+z=1$, $0\leqq x\leqq1$, $0\leqq y\leqq1$, $0\leqq z\leqq1$) in which the concentration of an n-type carrier is 1×10^{19} cm^{-3} or less, wherein the concentration of a p-type dopant is 1×10^{17} cm^{-3} or more and 1×10^{21} cm^{-3} or less is adjacent to a layer composed of a p-type ~~3—5~~ III-V group compound semiconductor represented by the general formula $In_aGa_bAl_cN$ ($a+b+c=1$, $0\leqq a\leqq1$, $0\leqq b\leqq1$, $0\leqq c\leqq1$).

Please amend the paragraph beginning on page 10, line 20 to page 11, line 2 as follows:

The ~~3—5~~ III-V group compound semiconductor in which a layer having a function as a barrier layer in which the p-type dopant concentration is in a specific range is adjacent with a p-type layer can be combined with a layer composed of a ~~3—5~~ III-V group compound semiconductor represented by the general formula $In_uGa_vAl_wN$ ($u+v+w=1$, $0<u\leqq 1$, $0\leqq v<1$, $0\leqq w<1$) having a function as a light emitting layer, to give a light emitting device excellent in light emitting efficiency.

Please amend the paragraph on page 11, lines 3-15 as follows:

Further, the ~~3—5~~ III-V group compound semiconductor [4] of the present invention has a structure comprising at least one layer (low carrier concentration layer) composed of a ~~3—5~~ III-V group compound semiconductor represented by the general formula $In_xGa_yAl_zN$ ($x+y+z=1$, $0\leqq x\leqq 1$, $0\leqq y\leqq 1$, $0\leqq z\leqq 1$) in which the concentration of an n-type carrier is 1×10^{19} cm^{-3} or less, wherein the concentration of a p-type dopant is 1×10^{17} cm^{-3} or more and 1×10^{21} cm^{-3} or less, between a layer (light emitting layer) composed of a ~~3—5~~ III-V group compound semiconductor represented

by the general formula $In_uGa_vAl_wN$ ($u+v+w=1$, $0<u\leqq 1$, $0\leqq v<1$, $0\leqq w<1$) and a layer composed of a p-type ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_aGa_bAl_cN$ ($a+b+c=1$, $0\leqq a\leqq 1$, $0\leqq b\leqq 1$, $0\leqq c\leqq 1$).

Please amend the paragraph on page 12, lines 2-20 as follows:

Further, when used in a light emitting device, the ~~3-5~~ III-V group compound semiconductor [5] has a structure comprising a second layer composed of a ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_uGa_vAl_wN$ ($u+v+w=1$, $0<u\leqq 1$, $0\leqq v<1$, $0\leqq w<1$) carrying thereon a laminated layer composed of an n-type ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_pGa_qAl_rN$ ($p+q+r=1$, $0\leqq p\leqq 1$, $0\leqq q\leqq 1$, $0\leqq r\leqq 1$) having larger band gap than that of the above-mentioned second layer, and at least one layer composed of a ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_xGa_yAl_zN$ ($x+y+z=1$, $0\leqq x\leqq 1$, $0\leqq y\leqq 1$, $0\leqq z\leqq 1$) in which the concentration of an n-type carrier is 1×10^{19} cm^{-3} or less, wherein the concentration of a p-type dopant is 1×10^{17} cm^{-3} or more and 1×10^{21} cm^{-3} or less, between the above-mentioned layer

composed of the n-type ~~3-5~~ III-V group compound semiconductor and a third layer composed of a p-type ~~3-5~~ III-V group compound semiconductor represented by the general formula $In_aGa_bAl_cN$ ($a+b+c=1$, $0 \leqq a \leqq 1$, $0 \leqq b \leqq 1$, $0 \leqq c \leqq 1$), on the opposite side to the above-mentioned second layer.

Please amend the paragraph beginning on page 12, line 21 to page 13, line 12 as follows:

For example, in this ~~3-5~~ III-V group compound semiconductor, a light emitting layer, n-type layer, low carrier concentration layer and p-type layer are adjacent in this order. For efficient recombination and light emission of injected charges, it is preferable that the band gap of an n-type layer is larger than that of a light emitting layer. The band gap between an n-type layer and a light emitting layer is preferably 0.1 eV or more, more preferably 0.3 eV or more. The preferable film thickness of an n-type layer is 10 Å or more and 1 μm or less. The light emitting efficiency of a light emitting device may decrease both when the film thickness of a low carrier concentration layer is lower than 10 Å and when larger than 1 μm. Further, the preferable film thickness of a low carrier concentration layer is 10 Å or more and 1 μm or less. The light

emitting efficiency of a light emitting device may decrease both when the film thickness of a low carrier concentration layer is lower than 10 Å and when larger than 1 μm.

Please amend the paragraph beginning on page 13, line 13 to page 14, line 2 as follows:

In the ~~3-5~~ III-V group compound semiconductor of the present invention, when the crystal mixing ratio of InN of a light emitting layer is high, thermal stability is not sufficient, and deterioration may occur in crystal growth or semiconductor process. For the purpose of preventing such deterioration, a layer having low crystal mixing ratio of InN can be laminated on a light emitting layer, to impart a function as a protective layer to this layer. The low carrier concentration layer of the present invention has a function as a protective layer. For giving sufficient protective function to the protective layer, it is preferable that the protective layer as an InN crystal mixing ratio of 10% or less and an AlN crystal mixing ratio of 5% or more, and it is more preferable that the protective layer as an InN crystal mixing ratio of 5% or less and an AlN crystal mixing ratio of 10% or more.

Please amend the paragraph on page 14, lines 16-19 as follows:

As described above, the light emitting device of the present invention is obtained by using a ~~3—5~~ III-V group compound semiconductor according to any of the above-mentioned [1] to [5].

Please amend the paragraph on page 19, lines 8-17 as follows:

The ~~3—5~~ III-V group compound semiconductor of the present invention can be laminated to control the carrier concentration of an InGaAlN mixed crystal in a lower range with high reproducibility since the p-type dopant concentration of the semiconductor is 1×10^{17} cm^{-3} or more and 1×10^{21} cm^{-3} or less. Further, in the ~~3—5~~ III-V group compound semiconductor of the present invention, the carrier concentration of an InGaAlN mixed crystal is controlled in a lower range with high reproducibility, and a light emitting device obtained by using the ~~3—5~~ III-V group compound semiconductor has high light emitting efficiency.